

PNG mineral boom: Harnessing the extractive sector to deliver better health outcomes

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Abstract

International experience has shown that mining and resources sector participation in Public-Private Partnerships (PPPs) can realise substantial health benefits not only for the company, but also for its public sector partners and communities. This paper summarises the international experience, and presents examples of mining and resource sector participation in health care in Papua New Guinea (PNG). The extractive industries in PNG are already actively involved in health service delivery and improving health conditions in the area within which they operate. With the prospect of major economic growth in PNG comes an opportunity to further systematise and expand on the application of industry expertise to creating lasting development in the PNG health sector for the benefit of the private sector, the government and the community alike. The paper also discusses some of the challenges in further harnessing the private sector as a partner in PNG development, including i) barriers to collaboration; ii) engaging with extractive industry partners; and iii) developing relationships and trust.

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1. Introduction

Papua New Guinea (PNG) ranks last among ADB's Pacific developing member countries on both the Human Development Index (148 out of 182 countries worldwide) and the Human Poverty Index of the United Nations (United Nations Development Programme 2009). Roughly 40% of all PNGeans were recorded as living in poverty in 2009 (AusAID 2009), 10% more than recorded in 1995 (PNG National Executive Council 2004). PNG has recorded limited progress against the United Nation's (UN) Millennium Development Goals (MDGs). The MDGs are a set of 8 human and economic development goals adopted by all UN members states including PNG for the 2000-2015 period. A 2004 review of PNG's progress toward the MDGs found that it would be very difficult for PNG to achieve most of the targets within the established timeframe (PNG National Executive Council 2004).

Many health indicators in PNG have deteriorated in recent years, including the availability and performance of health facilities. "The reported national prevalence of tuberculosis, malaria, typhoid and other infections have not declined in the past three decades" (Naraqi, Feling & Leeder 2003, p. 7). HIV/AIDS, malaria and tuberculosis (TB) are widely recognised as priority issues, with each receiving significant international attention with a global fund to fight the three diseases created in 2002 (The Global Fund 2007). The adoption of western diets and lifestyles have also lead to an increase in dental problems, heart disease, obesity, diabetes, and micronutrient deficiencies (Banks 2001; Taufa & Benjamin 2001).

In contrast, there are buoyant economic forecasts, largely related to growth in the resources sector. There have been predictions that the PNG economy will double in 3 years with the establishment of a major LNG project (Oil Search Limited 2009). Revenue from resource operations makes up a large part of the country's economy (22% of GDP in 2004), while the government also receives significant international donor support (15-20% of government revenue in 2006). A pivotal question for the government and the resources sector alike is how this economic growth can be converted into broad

based and sustainable social development. We argue that business can play a significant role in the broader and more sustainable development of a nation and the attainment of the Millennium Development Goals.

In contrast, there are many in PNG, and indeed, among government and donors, who believe that a purely public sector response is the answer to development issues, although a recent OECD study suggests that this may not be based on sound evidence (Van der Gaag & Stimac 2008). The study examined whether there was any evidence that public health spending resulted in a more equitable distribution of health outcomes. There was no evidence that public expenditure on health produces better outcomes than private expenditure on health. The study also examined the differences in per capita spending on health care between different countries, finding that more than 90% of the difference is explained by variations in GDP. The study also found that total public and private resources for health care increased at about the same rate as the income level of the country. If this relationship holds true for PNG then health care spending may be expected to double in the next two to three years with the expansion of the resources sector. A key question arises, what will this money be spent on and how?

The government has and will always have a number of key roles to play in the delivery of health services, be it regulator, funder or provider. Certainly it must be the regulator as only government can set and enforce regulations. With a prospective doubling of GDP and health care spending, clearly it should have the capacity to be the funder. The provision of health services however may benefit significantly from engagement with the private sector and other health related organisations.

Churches already run 45% of all health facilities in rural areas, and employ 23% of all health workers. According to the review of health services in 2003 (Churches Medical Council 2003), church facilities deliver about half of all ambulatory care, facility based deliveries, and immunizations in the provinces (Matheson et al. 2009). There may be potential to fund and expand their role, especially in rural areas. Non-governmental organizations (NGOs) have proliferated in the health sector in recent years, largely due to HIV funding, and now are a small but growing set of service providers. Private health care providers have a small but growing foothold in larger urban areas, and can be expected to grow. In many low income countries 50% or more of the resources spent on

health are private resources, with private services purchased by rich and poor alike and drugs being sold in private pharmacies. Developing, engaging and supporting a well-managed and effectively regulated private sector will be an important strategy element for the delivery of health care to the population of PNG. Another strategy will be to harness the business community, in particular the resources sector, to develop sustainable health programs for local communities, which create benefit for both the business and the community. This paper will focus on the potential benefits and the problematic issues related to increasing engagement with the extractive industries to create lasting development in the PNG health sector during the resources boom.

2. Global Experience with Health and the Extractive Industries

There are potential benefits to government and industry alike in looking at future extractive industry developments as having both social and economic potential. Resource sector partnerships can contribute to local and national public health strategies by: (i) utilising industry business skills and networks, monitoring capacity and technical expertise to assist in meeting public health goals and objectives; (ii) expanding the reach of public health services and initiatives; (iii) assisting with capacity development in public sector and civil society partner organisations; and (iv) providing financial and in-kind support (Bloom et al. 2006; Bloom, Mahal & River Path Associates 2001; Boldrini & Trimble 2006; Global Health Initiative 2007; Sidhu 2008; Sulzbach et al. 2005).

The potential benefits of resource sector partnerships for government include: (i) expansion of the reach of public health services; (ii) improvement of the quality of public health services; (iii) delivery of health services at lower cost than through alternative measures; (iv) strengthened financial, logistical and in-kind support; (v) improved infrastructure capability to support operation and maintenance; (vi) strengthened public health programmes for priority issues such as HIV and AIDS; (vii) capacity development of the health system; and (viii) the presence of a viable partner who can guarantee delivery of strategic health priorities in districts over a long period (many extractive industries have a life cycle above 20 years).

The potential benefits of involvement in health partnerships for industry include: (i) improved social development in extractive industry affected areas; (ii) improved quality

of health care for workforce; (iii) strengthened risk mitigation in relation to epidemics and communicable disease, leading to lower healthcare costs through prevention of costly conditions; (iv) communities from which it will draw much of its workforce will be healthier; and (v) enhanced social license to operate.

The potential costs (direct and indirect) to government include: (i) expertise to plan, develop, negotiate contract and manage and monitor; (ii) continuation of existing funding allocation; (iii) technical contribution to program development; (iv) possible additional contribution from royalties, either directly or via communities; and (v) cost of ongoing operation upon exit of the company.

The potential costs (direct and indirect) to industry include: (i) allocation of time to plan, develop, negotiate contract and manage and monitor; (ii) costs of implementation (money, people, logistics etc); (iii) relationship management; and (iv) cost of technical expertise to ensure program quality.

Corporate social responsibility, or maintaining a social license to operate, is becoming increasingly important to the extractive industries. There are growing expectations on resource companies to contribute to and support local social and economic development initiatives with a number of organisations involved in promoting involvement and monitoring performance of resource companies in this area including the International Council on Mining and Metals (ICMM), the Global Reporting Initiative (GRI) and the International Finance Corporation (IFC). Svendsen (1998) notes that while investors do not necessarily reward socially responsible companies, announcements of socially irresponsible events are invariably followed by significant downturns in the that company's stock value.

In summary, partnerships for health and social development between the government and the resources sector offer an opportunity for companies to improve the quality of health care available to their workforce and local communities. This can help companies to ensure the continued fitness for duty of the local labour pool and develop internal capacity to understand and manage health issues (The Center for Business and Government et al. 2004).

2.1. Global case studies

There are a range of published case studies on resource sector partnerships, largely from Africa, most of which are primarily concerned with the prevention and treatment of HIV/AIDS, malaria and TB (Brink & Pienaar 2007; Daly 2000; Diara, Alilo & Mc Guire 2004; Global Health Initiative 2008; Pefile 2002; Sinanovic & Kumaranayake 2006a, 2006b, 2006c; Spielman et al. 2002; Utzinger et al. 2005). There is also some mention of other less formal resource sector health partnerships (Hamann 2004). There is little published on broader based community health and development programs.

In this section, a summary of published international case studies related to HIV, malaria and TB are presented. HIV/AIDS, malaria and TB are recognised as priority issues in the global effort to improve health conditions (The Global Fund 2007). The most comprehensive collection of industry case studies is that of the Global Health Initiative (GHI) of the World Economic Forum. The GHI has compiled case studies on the rationale and approaches of 50 international organisations and businesses to the management of HIV/AIDS, malaria and tuberculosis (World Economic Forum 2007) including 10 mining related case studies from South Africa, Tanzania and Zambia (Anglo Gold 2003a, 2003b; Anglovaal Mining 2002; Barrick Gold 2002; De Beers 2002; Geita Gold Mine 2002; Gold Fields 2002, 2003; Konkola Copper Mines 2002; South Deep Mine 2002) and four oil and gas related case studies from Angola, Nigeria and Cameroon (Chevron Texaco 2002, 2003a, 2003b; Exxon Mobil 2002). There are many other industry case studies covering topics such as programs in the mining industry for HIV/AIDS (Brink & Pienaar 2007; Campbell & Williams 1999; Campbell, Williams & Gilgen 2002) and malaria (Ngugi, Chiguzo & Guyatt 2004), business perceptions of major communicable diseases in African nations (George & Whiteside 2002; Oppong 2001) and health impact assessment in African resource projects (Utzinger et al. 2005).

2.2. HIV/AIDS case studies

The World Economic Forum's Global Health Initiative (GHI) study of case studies on the business response HIV/AIDS found that: (i) employees are the main target of programmes, with employees' families, local communities, other businesses and high-risk groups such as commercial sex workers being secondary targets; (ii) most case study firms have implemented their programmes with assistance from governments,

NGOs, unions, business coalitions or alliances, or other businesses (as well as strengthening the knowledge and skills base on which policies are built, this may have spin-off effects in encouraging other organizations to become involved); (iii) most firms include both prevention and treatment; and (iv) all case study firms regularly evaluate the effectiveness of their programmes.

There are two examples of the development of an HIV/AIDS management system (George & Whiteside 2002; Gold Fields 2003), with other cases emphasising the importance of well defined and structured planning and implementation (Barrick Gold 2002; Campbell & Williams 1999; Geita Gold Mine 2002). Stakeholder engagement was noted as an important success factor in three cases (Barrick Gold 2002; Chevron Texaco 2003a; Geita Gold Mine 2002), while stakeholder education was also noted as a success factor (Gold Fields 2003). Campbell & Williams (1999) noted that factual awareness of HIV/AIDS has not resulted in demonstrable behaviour change in the South African mining workforce, thus highlighting the importance of behaviour change programmes such as those which were noted as a factor of program success by Anglo Gold (2003). Campbell, Williams & Gilgen (2002) noted that involvement in some community organisations such as sports teams can lead to positive behaviour change. Finally the swift / immediate implementation of best practice was cited as an important success factor in two cases (Anglo Gold 2003b; Gold Fields 2003), with Anglo Gold stating that a factor of their programs success was that they *"spend less time and money on the risk assessment analysis which is costly and can produce unreliable estimates, and more resources on acting"* (Anglo Gold 2003b, p. 7).

Expenditures on HIV/AIDS programs in extractive operations in Africa range from \$48 per employee to \$97 per employee as can be seen in Table 1. These expenditures often include large-scale community programs, and thus are not representative of how much is being spent on each individual worker.

Table 1: HIV/AIDS prevalence rates and budgets from selected case studies

Country	Workforce prevalence rate	Annual program budget¹
South Africa (Anglo Gold 2003b)	30%	\$2.6 million = \$58 per employee
South Africa, Zambia and Namibia (Anglovaal Mining 2002)	14%	\$255,000 = \$48 per employee
Tanzania (Barrick Gold 2002)	4% (predicted possible escalation to 20%-40%)	\$93,000 = \$63 per employee
South Africa (Gold Fields 2003)	30%	\$2.4 million = \$46 per employee
South Africa (South Deep Mine 2002)	30%	\$240,000 = \$51 per employee
Nigeria (Chevron Texaco 2003a)	6% to 8% UNAIDS country estimate company estimate of 2.5%	No cost information provided

The HIV/AIDS program of the Anglo American mining company has shown that business participation in managing HIV/AIDS can have a positive impact on both health and profits. Anglo American's community health partnership initiatives in South Africa were based on their internal business models, focusing on specific goals, defining and measuring key performance indicators for these goals and utilising sound management practices. Savings related to the program outweighed the cost of the program which resulted in a reduction in AIDS related illness and death, TB rates and absenteeism of HIV positive employees (Brink & Pienaar 2007). The HIV/AIDS program was initiated and developed within the company over the last 20 or so years and extended out to the community in 2003. Anglo's community efforts are based on taking experiences the company has had success with in the business and applying them on a larger scale to communities. An example of this is a project to build a community health centre at Lillydale in the Bushbuckridge Municipality, Mpumalanga Province. Lillydale is a poor

¹ All costs in US dollars

rural area of high HIV prevalence where the government health system has been unable to cope with the epidemic. A number of Anglo's employees come from the area, and the company is working to improve the quality of healthcare in this rural community through a public/private partnership. Anglo Coal South Africa has partnered with Sir Richard Branson's Virgin Unite and the President's Emergency Plan for HIV/AIDS Relief in the initial rollout of this project. It also plans to partner with the local public health service and with non-governmental organizations.

The business case for managing HIV/AIDS ranged from a predominantly economic case (Anglovaal Mining 2002; Campbell & Williams 1999) to a predominantly social case (Barrick Gold 2002). Most companies lay somewhere in the middle citing a combination of social responsibility and protecting the profitability of the operation / reducing the costs incurred by the disease (Anglo Gold 2003b; Chevron Texaco 2003a; Geita Gold Mine 2002; Gold Fields 2003; South Deep Mine 2002; Utzinger et al. 2005). Oppong (2001) noted that in Ghana smaller businesses were less aware of the business case for managing HIV/AIDS, whereas these businesses were highly aware of the business case for managing malaria.

Success factors of industry HIV/AIDS programs included the implementation of formal management systems, management commitment, stakeholder engagement, focusing on behavioural change, swift implementation of best practice and the implementation of specific innovative programs.

2.3. Malaria case studies

A recent report by the World Economic Forum lists possible roles in malaria control for firms working in particular sectors (Bloom, Bloom & Weston 2006). These include : (i) firms working in the health sector developing new drugs, cheaper and more efficient diagnostic malaria tests and vaccines, and strengthening medical infrastructure and training; (ii) construction and engineering firms building mosquito-proof structures, and promote vector control by draining or filling in breeding sites; (iii) energy companies making dam reservoirs safe against malaria; (iv) firms working in the food, beverage and retail sectors using their strong distribution networks to deliver malaria prevention and treatment tools; (v) information technology businesses working with governments to develop surveillance systems to track the disease and predict outbreaks and working

to strengthen health management systems; (vi) media and entertainment firms promoting awareness of malaria and educating consumers about prevention and treatment; (vii) financial services firms helping the poor cope better with malaria by developing micro-credit programmes that are linked to the provision of information about health insurance or its purchase; and (vii) logistics and transport firms deploying their services in delivering malaria commodities.

All firms in vulnerable areas can educate employees and their families about prevention and treatment or train community-based volunteers to educate. They can also provide or facilitate the administration of drugs and distribution of bed-nets. In addition, firms can assist governments in building up more robust malaria databases by collecting data on the disease's incidence among employees and the surrounding communities.

Three malaria case studies provided information on prevalence rates and annual site or corporate budgets. It can be seen in Table 2 that program budgets range from \$12 to \$85 per employee, with between \$17 and \$49 spent per case. Higher levels of spending correspond to increased levels of prevention activities, with the Chevron Texaco case reporting only their spending on anti-malarial medication. In these three cases, the business case for managing malaria involved both the savings that would result from the reduction of the direct and indirect costs of malaria to the company and the importance of reducing the burden that malaria imposes on employees, their families and communities (Chevron Texaco 2003b; Exxon Mobil 2002; Konkola Copper Mines 2002). Corporate commitment to social responsibility was also cited as an aspect of the business case by Chevron Texaco. Konkola Copper Mines, which had the lowest workforce prevalence rate of the three cases, stated that malaria results in significant direct and indirect costs to business.

Table 2: Malaria prevalence rates and budgets from selected case studies

Country	Workforce prevalence rate	Annual program budget
Zambia (Konkola Copper Mines 2002)	540 cases per 1,000 employees in 1 year	\$230,000 = \$20 per employee or \$37 per case (on prevention programme)
Nigeria (Chevron Texaco 2003b)	716 cases per 1,000 employees in 1 year	\$22,000 = \$12 per employee or \$17 per case (on anti-malarial drugs only)
Cameroon and Chad (Exxon Mobil 2002)	1,750 cases per 1,000 employees in 1 year	\$870,000 = \$84 per employee on \$49 per case (control program and partnership)

Success factors of malaria management programs included effective management, swift implementation of best practice, the implementation of specific innovative programs and effective stakeholder engagement. A clear and systematic planning process which facilitates effective and efficient collaboration with other organisations and ensures multiple layers of controls proved successful at Exxon Mobil, while both Exxon Mobil and Konkola Copper Mines noted that rigorous monitoring of cases and outcomes supported a more effective and timely decision making process. Utilising best practice, establishing quality laboratory and treatment capacity, comprehensive intra-domicile residual spraying with a proven insecticide and the early diagnosis of cases and a swift response to reduce the severity of the case were all noted as important factors of program success (Chevron Texaco 2003b; Konkola Copper Mines 2002). It was found that it is possible to finance community intra-domicile residual spraying to reduce the local mosquito population through savings due to the associated reduction in cases and their direct and indirect costs to the business (Konkola Copper Mines 2002). The establishment of local community groups that sell bed-nets to individuals and businesses at a small profit can lead to a sustainable local business venture which may be able to continue to operate post closure, and also to a reduction in cases and associated costs (Ngugi, Chiguzo & Guyatt 2004). Community involvement in malaria control programmes was a key success factor in all cases (Chevron Texaco 2003b; Exxon Mobil 2002; Konkola Copper Mines 2002).

2.4. Tuberculosis case studies

Data concerning industry tuberculosis management programs differed greatly by company with prevalence rates varying by a factor of ten in companies within the same country. Annual budgets show significant expenditure per employee of \$75 to \$111, with De Beers stating that treatment for their employees was provided by government health services and Gold Fields providing information on their programme without details of expenditure.

Even though workforce prevalence rates of active tuberculosis cases were low, Gold Fields (2002, p. 2) stated that “a study of gold mines in South Africa estimated that nearly 90% of employees have latent TB infection.” With the increasing prevalence of HIV/AIDS, there is an increase in the conversion of latent infections to active cases. The business case for managing tuberculosis included the increasing costs being incurred due to the increase in active cases (Anglo Gold 2003a; De Beers 2002; Gold Fields 2002), and the responsibility of the company towards their employees and the local community (Chevron Texaco 2002; De Beers 2002).

Factors of success for tuberculosis management programmes included consistency (of service provision, drug supply and education) and management commitment (Anglo Gold 2003a; Chevron Texaco 2002) and a focus on local implementation with deep community level involvement (Chevron Texaco 2002).

Table 3: Tuberculosis prevalence rates and budgets from selected case studies

Country	Workforce prevalence rate	Annual program budget
South Africa (Anglo Gold 2003a)	23 cases per 1,000 employees	\$3.8 million = \$75 per employee
South Africa (De Beers 2002)	2.3. cases per 1,000 employees	No data
South Africa (Gold Fields 2002)	33 cases per 1,000 employees	\$300,000 = \$111 per employee
Angola (Chevron Texaco 2002)	1.7 cases per 1,000 population (including community)	\$300,000 = \$111 per employee

2.5. Case study summary

Many major resource companies operating in African nations are actively involved in the provision of health services in communities with similar prevalence of disease to those experienced in PNG. Application of resource industry expertise in project development and implementation, management systems, logistics and corporate governance to health improvement have shown positive returns on investment for mining companies with respect to decreased direct and indirect cost of disease and for the community with respect to improved health conditions. Partnerships for health which draw on industry expertise to deliver positive health outcomes in PNG are discussed in the next section.

3. Extractive industries and health in PNG

PNG relies heavily on the extractive industries income to support its economy. Mining and petroleum accounted for 22% of PNG's gross domestic product in 2004 (Manning 2005), while total mineral export receipts amounted to K2000.1 million in the March 2009 quarter (Guinea 2009) and mining and petroleum tax revenue accounted for approximately 43% of government tax revenue in 2006 (PNG Department of Treasury 2006).

The most recent development in the PNG resource sector is the PNG LNG Project, operated by ExxonMobil (Oil Search Limited 2009). The LNG Project is projected to be PNG's largest resource and most profitable resource operation. It is also shaping up to be the most complex and largest geographical impact. It arguably also has great potential to impact positively or negatively on social and economic development.

The major stakeholders of the PNG mining industry include mining corporations, shareholders, local communities and landowners, national, provincial and local level governments and their agencies, employees, NGO's, suppliers and the broader community of PNG (Banks 2001).

Since independence the PNG government policy on mining has been to utilise mining taxation revenue to promote development in other sectors of the economy. In reality, little development has occurred and the PNG economy has continued to be reliant on mining revenue (Banks 2001; Connell 1997). Connell (1997) concludes that the processes of change that characterise development must be viewed in both economic and social terms, with most efforts in PNG to date being focused on economic development.

The mining industry is playing and will continue to play a large part in the development process due to its significant contribution to the economy and its efforts to promote sustainable development in mining areas. Where the responsibility lies for providing solutions to the social and economic problems that hinder development is a question to which there is no single answer. Partnerships between the government, the private sector and civil society organisations are becoming increasingly popular (Ratzan 2007).

The National Government of PNG receives substantial tax revenue from the mining industry. Through the Department of Mining (DoM), it makes policy for regulating the industry and is a regulator for the industry through the Mineral Resources Authority (MRA). Through the Mineral Resources Development Company Pty Limited (MRDC) it is also a part owner of a number of mining operations. The National Government, in collaboration with the Provincial Government utilises tax revenue from the operations to fund public services in impact areas, and has also implemented a tax credit scheme through which companies may claim tax credits on expenditure on local infrastructure development and capacity building of up to 0.75% of their gross revenue (Banks 2001).

Provincial governments of mining areas also receive substantial tax revenue from the mining industry, and are involved in the implementation of the tax credit scheme. Provincial governments are often located in the provincial capitals which are far from the mining areas. It has been noted that Provincial government involvement in service provision in mining areas may often be politically motivated and of a temporary nature (Banks 2001). Indeed, in some cases it has been said that due to the benefits provided to the local community through mining land use agreements, the “government *has abandoned its usual functions in these areas, leaving it to the resource company to provide roads, schools, health services, agricultural extension and supply services*” (Asian Development Bank 2000, p. 56).

Local Level Governments (LLGs) generally lack the resources and capacity to carry out many of their administrative responsibilities. The support of mining operations in developing the structures and practices required for effective and efficient governance generally results in LLG’s being stronger in mining areas than elsewhere. Special purpose authorities such as the Porgera Development Authority and the Nimamar Development Authority (Lihir) have been put in place to assist in LLGs with the implementation of long term development plans in mining areas (Filer 2004). Mining operations are often careful not to take on the functions of the LLG as there can be a perception that doing so may prevent the LLG from developing the capacities necessary for sustainable development post mining.

3.1. Health impacts and interests

Resource operations in PNG are typically located in some of the most remote and inaccessible parts of the country and draw their workforce from across the nation. Remote local communities are generally characterised by poor health and living conditions and access to quality health services in these remote areas is typically limited.

Local communities generally experience great change with the development of a mining operation in their area. They gain increased access to health, education and other infrastructure, royalty payments and employment opportunities. Conversely, local communities are also seen to be “bearing *the brunt of the social, cultural and environmental changes that the mines bring*” (Banks 2001, p. 25). There have been

instances of violent conflict between local communities and mining operations in PNG, mainly with respect to the amount and distribution of royalties. Migration into mining areas often results in crowded squatter settlement areas. These areas generally have poor access to services, typified by low levels of sanitation and maintenance of infrastructure. Hygiene amongst migrants who may have very little in the way of resources and do not have any rights to the land can be even poorer than rural hygiene, primarily due to over-crowding and a lack of resources. Due to the limited transport infrastructure of PNG some mining areas are not accessible by road. Most mining areas are far from regional centres and consequently have poor access to public services other than those provided by the mining operation. The type of transport routes by which mine sites are accessible can play a role in determining the types of exposure to communicable disease that are experienced by the workforce and local communities. Large scale mine sites that provide public services and are easily accessible generally experience higher levels of migration and settlement which may result in increased exposure to different types of communicable disease. The logistics chain of each operation may also need to be considered when developing an understanding of workforce exposure patterns.

PNG has a long history of resource sector involvement in health care with the first formal hospital established by a mining venture being built by Bulolo Gold Dredging Ltd. to serve its employees in the early 1930's (Dunkin 1950). The next major mining related health services project was the hospital built in Arawa in 1972 to serve the Bougainville copper mining operation (Pacific Publications 1976). The construction of the hospital was a part of the Government's mining agreement with Bougainville Copper Limited as set out in the Mining (Bougainville Copper Agreement) Act of 1967 (Independent State of PNG 1967). The agreement stated that the mining company was to fund and carry out (or contract out) the construction of the hospital at a location agreed upon with the government (then the Australian Administration of PNG) and that the government would fully reimburse the company within two months of completion unless agreed otherwise. The government would then staff and service the hospital and continue to do so at no cost to the company apart from normal service charges. Since then most major mining operations have constructed and operated, or assisted in operating, hospitals in their areas through various forms of partnership with the government. The major mine

sites in PNG have all supported the development of medical services in their respective areas. Facilities operated by mining operations and some other companies are generally well equipped, staffed and utilised and provide possibly the highest quality services in the country (Izard & Dugue 2003).

The PNG Institute of Medical Research (PNGIMR) has a collaborative relationship with the mining industry which has resulted in a range of health initiatives and academic publications (Alpers 1999; Hii, J et al. 2000; Hii, J. et al. 1997; Hombhanje et al. 1998; Selve et al. 2000; Spicer & Lucena 1998; Vail 2002).

Other notable initiatives that have been carried out by members of the industry include the filariasis eradication programs in the regions surrounding the Misima, Lihir and Ok Tedi gold mines which all resulted in significant reductions in the incidence of the disease within a matter of years (Hii, J et al. 2000; Jackson 2002; Schuurkamp 1992). The program in the Misima island group has proven to be sustainable since closure of the mine with an enduring local network distributing the annual dose of medication required to treat the disease. This network is also being used to distribute insecticide treated bed nets which reduce the incidence of not only filariasis but malaria as well.

Banks (2001) provides a broad overview of health trends in the mining industry and its local communities. Banks cites reductions in malaria in filariasis, dramatic increases in life expectancy, improved maternal and child health, improvements in safe water supplies, the eradication of yaws in remote areas and large scale health programmes to assist health service delivery in remote areas. He also notes that there is a basic paradox when it comes to community health in mining areas, which is that even though mining results in a marked increase in local health resources, community health indicators do not necessarily improve. Contributing factors for this phenomenon include the increased burden on the health system caused by the large numbers of migrants that are invariably attracted to mining areas in PNG, the introduction of new diseases and health issues through increased contact with external populations (including asthma, dental problems and communicable diseases such as STIs and HIV/AIDS) and potentially limited utilisation of public health expertise (Banks 2001; MMSD 2002). Banks (2001, p. 47) further notes that there is a lack of data concerning the impacts of mining operations

on community health and that any available data is generally “*patchy in terms of geographical, temporal or disease focus.*”

Extractive industries in PNG are generally faced with poor or limited government health services (especially in remote areas) and workforces which are regularly exposed to communicable diseases in the local community and in their home communities for the case of fly-in fly-out employees. The majority of large scale mining operations have for many years been providing health services for their workforces and also in many cases for the local community.

In the following section, case studies of current resources sector programs, that have the potential to extend sustainable benefit to local communities are presented.

3.2. The ADB HIV in enclaves project

In 2006, the Asian Development Bank (ADB) approved a grant of US\$15 million for HIV/AIDS Prevention and Control in Rural Development Enclaves – to attain higher levels of coordination among government, private sector, development partners, NGOs, community-based organizations, private sector organizations, and affected communities in the fight against HIV/AIDS. The project's total cost is estimated at \$25 million, of which Australia and New Zealand are providing \$3.5 million each. The remaining \$3 million comes from the Government of PNG. ADB's grant is provided from its Asian Development Fund, which provides concessional loans and grants for its poorest developing member countries.

The Project has focused on rural areas where communities are centered on mines, plantations, fisheries plants, or other private sector operations. The project aims to help the Government initiate partnerships with the private sector operators at such communities to set up or improve primary health care and HIV/AIDS treatment and prevention facilities. The Project uses a partnership approach with industries to rehabilitate and strengthen rural health services and to use the strengthened primary health care system as a platform from which to control the HIV epidemic. The Project was designed in close coordination with the HIV/AIDS initiatives under the Global Fund through the National Department of Health, the National AIDS Council Secretariat and the main development partners in PNG. The program has a strong focus on facilitating

the development of public private partnerships through which to deliver HIV/AIDS activities and programs, particular facility based services and behavioural change activities, in enclave communities.

3.3. Oil search - Aalaria

Oil Search in Moro, Southern Highlands have achieved impressive results in malaria control. Their public health team have provided support and supervision for surrounding church, government and NGO health providers, making standard treatment courses and malaria diagnostics available through local community workers and storekeepers. They have also monitored the impact of this with reductions in malarial transmission being demonstrated from a prevalence of 25% to less than 5 % in 12 months (Hutton 2007). Oil Search has also supported an HIV/AIDS control program for the area and the strengthening the local health physical infrastructure, both in collaboration with the ADB HIV in Enclaves Program, and funding from the tax credit scheme.

3.4. Ok Tedi – Dorth fly health services development program

For many years, Ok Tedi Mining Limited (OTML), has operated a high quality hospital, which provides services for the mine workforce, and arguably acts as a referral hospital for North Fly, Middle Fly and parts of Sandaun Province.

More recently, in 2008 the OTML Board approved a K20 million health services development program for the entire North Fly District. The Program addresses the main causes of illness and death in North Fly District, the priority areas needed for improvement to strengthen health service delivery (effective health intervention, essential infrastructure and logistics, human worker capacity, community participation and population coverage). A key principle underpinning the Program is to support the existing health system, not to develop a new or parallel system. Support is provided to existing health service providers to enable them to deliver improved health services in line with PNG national standards. The health services company, which operates the Tabubil hospital, has been contracted as the Implementing Service Provider (ISP) and mobilized the Program in January 2009.

Ensuring that partners are engaged and committed is critical to the long term success and sustainability of the NFHSDP. Extensive stakeholder consultations were undertaken during the design and mobilization phases of the program. Partners were identified and the roles and responsibilities of each partner workshopped. Key partner organizations include the North Fly River District Government, the Evangelical Church of PNG, Catholic Health Services and the Ok Tedi Development Foundation. All partners have signed a Program Charter signifying the commitment of all partners to a shared partnership philosophy and underlying principles. By signing the Charter, partners also acknowledge and are committed to the identified essential elements of the Program; proposed interventions and strategic objectives; NFHSDP organizational structure, committees and Program governance and roles of Program partners.

Key achievements to date have include collaboration between partners for planning and coordination of health service delivery, particularly outreach patrols, a major bed net distribution project across the North Fly District, significant progress toward increasing the number of accredited VCT clinics in the district, establishment of regular delivery of essential medical supplies to remote areas that were previously under-supported and increased immunization coverage.

3.5. Lihir Islands community health plan

The Lihir Islands Community Health Plan (LICHHP) is a five year plan and forms the framework for a comprehensive community health response for the communities of Mahur, Malie, Masahet and Niolam Islands. The Plan was a funded initiative of the Lihir Sustainable Development Plan (LSDP). The LSDP is in turn funded through the Integrated Benefits Package (IBP) which is the primary community compensation package agreed between Lihir Gold Limited and the local community.

The LICHHP incorporates curative and preventative health services and programs. It promotes community responsibility for health and targets existing and potential disease burdens on the Lihir Islands. The LICHHP was designed following extensive consultation and review and was based on the Government of PNG's Minimum Standards for District Health Services in PNG (National Department of Health 2001). The Program is implemented through an alliance agreement between the Lihir Mining Area Landowner

Alliance (LMALA) and a specialist health services company under the overall direction of an Advisory Committee. LMALA and JTA are contracted by the LSDP.

The goal of the LICHP is to achieve sustainable improvements in the health of the Lihir community. The objectives of the plan are to:

1. Improve the quality of community health services
2. Improve delivery of preventive health programs to communities
3. Increase community empowerment and responsibility for their own health care
4. Develop the human resource capability on the Lihir Islands to deliver sustainable health services
5. Ensure effective coordination and management of the health program and improve partnerships with Provincial and Local Level Governments, communities, church groups, LGL, training organisations and other stakeholders to improve the health of the community.

The specialist health services company has been contracted by LMALA to support the implementation of the LICHP

The LICHP has pursued partnerships with existing health service providers on Lihir and other relevant stakeholders. These partnerships are formalized through Memorandums of Understanding with the LLG, Catholic Health Service, district and provincial government and Lihir Gold Limited. Proactive partner engagement is a key focus of the program and all program activities are delivered in conjunction with partners. Lihirian communities are also considered a key partner and much effort has been made to engage these communities in the planning for and delivery of community health activities, primarily through community consultations and awareness sessions.

Formalising agreements between the partners has been a key achievement in a highly political environment. In the first year of implementation LICHP made significant inroads into re-establishing systems required to support the strengthening of the health system on Lihir and ensure the communities have access to better quality services. A health worker in-service and refresher training began; many of the health workers had not undergone any training since working on Lihir and some of them had been there for more than 20 years. The supervisory system has been reinvigorated with the LICHP

team supporting a newly appointed district Health Manager to visit health facilities on a regular basis and provide clinical and administrative supervision. The Sub-District Health Committee has also been revived, with all health service providers coming together on a semi-regular basis. It is intended that the regularity of meetings will increase and the Sub-District Health Committee will provide a forum for coordinated health service planning and management. In addition to systems strengthening and capacity development of the workforce, the LICHIP has worked closely with partners and communities to redevelopment and open one aid posts and begin the redevelopment of a health centre.

3.6. Exxon Mobil

ExxonMobil is a global industry leader against malaria. ExxonMobil is involved in a wide range of global initiatives including Roll Back Malaria, a partnership of UN agencies, corporations, philanthropies, and non-governmental organizations. ExxonMobil's own workplace health program has been highly successful. ExxonMobil is represented on the Board of *Malaria No More*. ExxonMobil funding in Africa is being used to improve the delivery and use of prevention tools such as: bed nets; technical assistance to help countries significantly increase their capacity to control malaria; and the monitoring and promotion of progress through integrated communications methods. There is significant potential to benefit from ExxonMobil's global malaria experience in PNG.

3.7. Business Associations

The extractive industries have been involved in a National HIV/AIDS initiative through the private sector HIV/AIDS initiative of the PNG Chamber of Mines and Petroleum, the national representative body of the PNG mining and petroleum industry. The initiative was funded by AusAID and managed by the Chamber until March 2007. The initiative was merged with the PNG Business Coalition Against HIV/AIDS (BAHA) in March 2007. The coalition is funded jointly by AusAID and the business community and works closely with the National AIDS Council to engage the business community in addressing HIV/AIDS issues through advocacy and provision of support for the development of HIV/AIDS workplace policies (BAHA 2008). The National AIDS Council has noted that mining and petroleum operations are developing policies and programs for the prevention and treatment of HIV/AIDS and for the care of people living with HIV/AIDS

(PNG National AIDS Council 2007, p. 28). Business associations (like the PNG Australia Business Council) can also play a role. By distributing good practice guidelines to firms and acting as an information resource, these associations can help firms that lack the resources to create malaria programmes themselves. They can also encourage manufacturers of drugs and ITNs to provide more comprehensive information about the disease to consumers and to combat the problem of counterfeit drug sales which is prevalent in many developing countries.

3.8. Summary

From the brief examples shared above it can be seen that the extractive industries in PNG, and indeed other members of the private sector, are actively involved in health service delivery and improving health conditions in the locality and region within which they operate. The capacities and skills well established in industry are being applied to health service delivery with success in PNG, as they have been in Africa. With the prospect of major economic growth in PNG comes an opportunity to further systematise and expand on the application of industry expertise to creating lasting development in the PNG health sector for the benefit of the private sector, the government and the community alike.

4. Discussion

There is ample evidence that there is potential to engage the extractive industries in a positive way to contribute to PNG's efforts to achieve the Millennium Development Goals. In this section, we discuss some of the challenges to the systematic maximisation of the benefits of industry engagement in this area.

4.1. Barriers to collaboration

In a study of the role of the private sector in health systems in developing countries (Hozumi et al. 2008), the most common barriers to public private collaboration in the Western Pacific Region were found to be: (i) the lack of clear framework that support collaboration; (ii) the lack of economical incentives for collaboration; and (iii) the absence of political commitment to collaboration. These are barriers that will need to be

broken down if successful partnerships with extractive industries for social benefit are going to be developed.

4.2. Framework for collaboration

Currently, the government does not have the capacity to monitor and regulate a widely subcontracted health service model. Specific elements that would require development include an appropriate policy and regulatory environment, contracting and monitoring expertise, access to expert advisers for due diligence and transaction implementation, development of payment and performance models and development, management and negotiation expertise.

4.3. Political commitment to collaboration

The PNG Department of Health welcomes private sector collaboration. The PNG National Health Plan 2001 - 2010 devoted an entire chapter to Partnerships in Health and recognized that 'sustainable health outcomes ... cannot be achieved by the health sector alone using traditional approaches' (Ministry of Health 2000) and the 2009 Medical Society of PNG's Annual Medical Symposium addressed the theme Public Private Partnerships in Health Care in PNG.

However, the interest in Public Private Partnerships is wider than just the health sector. In 2003 the Prime Minister of PNG announced that public private partnerships to be one of the preferred procurement models for the country. Since then momentum within the Government of PNG has continued to build with a National Public Private Partnership policy approved in December 2008. The policy was developed through an extensive stakeholder and community consultation process undertaken by a Public Private Partnership Taskforce, which was expanded in 2009 to include the Departments of Health, education, Transport, Works, Land and Physical Planning, the Attorney General and the National Roads and Civil Aviation authorities (GoPNG *Department of National Planning and Monitoring* 2009).

4.4. Engaging with extractive industry partners

Globally there is growing expectation that resource companies contribute to and support and report on local social and economic development initiatives, including from

the International Council on Mining and Metals (ICMM), the Global Reporting Initiative (GRI) and the International Finance Corporation (IFC). On the extractive industries side, the case studies reported here demonstrate good will and in some cases pro-active initiation of broader long term public and community health partnerships.

The challenge is how to create a facilitating environment, which systematically encourages and enables business participation in the MDGs. This includes creating clear expectations in relation to industry social commitments, and broadening the fiscal instruments (such as the tax credit scheme and distribution of royalties) to create incentives for that participation.

Another challenge is to ensure that health impact assessments, undertaken early in the resource development cycle, consider a broad health management plan. This should not be restricted to the workforce, and also consider the development of local health services and programs to protect and develop the health of local populations during the life of the project.

Early engagement would usefully incorporate government, local health providers, and interested donors who may have complementary programs which could be rolled out in the local area (e.g. The Global Fund HIV, malaria and TB programs), or who may be able to contribute technical expertise. The MDGs are at the centre of the Australian Partnerships for Development, where there may be potential for constructive collaboration in some areas.

4.5. Developing relationships and trust

Relationship issues will be critical to the success of extractive industry partnerships.

“The relationship between public and private sectors has traditionally been, at best, icy. The private sector has seen governments and NGOs as inefficient, holier-than-thou bureaucracies, simultaneously squandering public money and complaining about not having enough of it. The public sector, on the other hand, has tended to view all business as inherently selfish and all business incursions into the public sphere as hypocritical” (Bloom, Mahal & River Path Associates 2001).

Better understandings need to be developed of the management of the differences in private and public sector motivations, expectations and ways of 'doing business' and other 'people issues'. Definition of 'core partnering issues' and how to create an 'enabling partnering environment', for example in use of terminology and language, context and culture, equity, power within partner relationships, leadership, trust between partners and partner involvement in planning and evaluation.

5. Conclusion

The extractive industries have a keen interest in HIV/AIDs, malaria and TB and will be vulnerable to the macroeconomic consequences of the HIV/AIDs epidemic. Individual operations also face potentially serious impacts of these diseases on their employees and markets. With respect to the business benefits of health improvement, studies relating to corporate wellness programs have indicated a 1.7:1 return on investment associated with reductions in medical and absenteeism costs (Isaac 2004). Anglo American's HIV/AIDS program also showed similar positive impacts with savings related to the program outweighing the cost of the program and reductions in AIDS related illness and death, TB rates and absenteeism of HIV positive employees.

Speed, efficiency, innovation, creative marketing and leadership are all more commonly found in a profitable environment and all are urgently needed in the fight not only against HIV/AIDS but also malaria and TB. The private sector has these skills, which are not always prevalent in the public sector (Bloom, Mahal & River Path Associates 2001). The extractive industries also have assets (such as premises, equipment, transport and delivery systems, and money), networks of contacts (workforce, customers, other businesses, access to governments, international reach) and a skill base (management and communication skills, monitoring capacities, information technology skills and employee knowledge) that can be a valuable resource in combating HIV, malaria and TB.

It is acknowledged that businesses are not development agencies, but that they can be significant development actors. In support of this proposition, the Lowey Institute's Jenny Hayward Jones contends that private sector engagement is critical in making progress towards MDGs (Hayward-Jones 2008). Privatisation of some health services and other social functions may result in more efficient provision of services which drive the achievement of these targets. The involvement of the private sector in development

initiatives is not a panacea for poverty, but it is a legitimate and valuable asset in the journey towards achieving the Millennium Development Goals.

The extractive industries are already operating in remote locations where health infrastructure is fragile, and their participation in partnership offers an immediate opportunity for health system strengthening, which would otherwise take years. Extractive industries have specialist expertise in locating and maintaining workforce and infrastructure in remote locations. The government and extractive industries have a shared agenda in terms of social development. Partnerships potentially create a win/win for both parties and this is firm ground for the development of partnerships (Matheson et al. 2009).

The experience with partnerships involving the mining sector in PNG has been encouraging. There is scope to mobilise and support the extractive industries in PNG to extend sustainable healthcare free at the point of use for substantial numbers of poorer individuals.

We suggest that collaborative and open discussion is needed about how to leverage the capacity and resources of the private sector and that the involvement of the private sector in health service provision can increase the scope and scale of service offerings for both private and public patients and result in substantial positive health outcomes for the people of PNG.

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